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Current state of ophthalmic care provision for the population of Ukraine and Kyiv

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Сучасний стан надання офтальмологічної допомоги населенню України та м. Києва

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Introduction

The issue of preserving the ophthalmic health of the population is extremely relevant for Ukraine, as visual impairments are registered in every third resident. Pathology of the visual organs and their adnexa (including cataract, myopia, glaucoma, and eye injuries) ranks sixth in the structure of morbidity and disease prevalence. The medical and social significance of eye diseases lies in the fact that ocular pathology often leads to permanent disability due to a significant reduction in visual acuity or complete blindness, which in turn results in economic losses for individuals and society as a whole [1].

Ophthalmology is one of the most overloaded outpatient specialties, as the demand for its services exceeds capacity due to population aging – a trend characteristic of Ukraine as well. For instance, in the United Kingdom, 36.4 % of all outpatient ophthalmology visits are made by individuals aged 75 and older [2]. In Ukraine, the main components of ophthalmic care provided in outpatient and inpatient facilities remain the diagnosis, treatment, and prevention of diseases related to the eyes and the visual system. However, the network of facilities may vary depending on the location of medical care, the availability of personnel and resources, which undoubtedly affects its accessibility. In recent years, ophthalmic care in Ukraine has been rapidly developing, encompassing both traditional and modern innovative diagnostic and treatment methods based on evidence [3].

The term “high-value care,” proposed by the American College of Physicians, refers to simultaneously improving health outcomes, avoiding harm, and eliminating waste in medical practice. Therefore, ongoing annual monitoring and analysis of changes in the organization and provision of ophthalmologic care at regional and national levels is essential for making effective management decisions and evaluating their outcomes [4].

Study objective: To examine the dynamics of staffing and resource indicators for ophthalmic care provided to the population of Ukraine and residents of Kyiv over the past 15 years, with particular focus on glaucoma.

Object, materials and research methods

The materials of the study included official statistical data from the Public Health Center of the Ministry of Health of Ukraine and the Kyiv City Information and Analytical Center for Medical Statistics. Indicators analyzed included the availability of ophthalmologists and ophthalmology beds for the adult population, indicators of their utilization efficiency, as well as ophthalmic surgical activity, including surgeries for glaucoma, during 2008–2024 across Ukraine, by regions, and for the city of Kyiv.

Despite the fact that absolute data from the Public Health Center and the Kyiv City Information and Analytical Center for Medical Statistics are available up to and including 2024, statistical analysis is limited by the absence of accurate data on the population size of Ukraine and Kyiv, particularly the adult population, since 2022 due to the full-scale invasion of Ukraine by Russian forces.

Of particular interest is a more detailed analysis of ophthalmic care provision in the city of Kyiv, where a significant share of Ukraine's public and private ophthalmology clinics is concentrated, along with a strong scientific and methodological base, and where highly qualified and experienced specialists, leading scientists, and educators in the field of ophthalmology work. Bibliographic, statistical, and analytical methods were used in the study.

Research results

The ophthalmic care system in Ukraine is quite extensive and includes ophthalmology rooms in outpatient facilities (in 2024 there were 818 across Ukraine and 30 in Kyiv), ophthalmology departments in 139 hospital institutions with a total of 2,876 beds, where more than 175,338 patients were treated in 2024 alone, as well as a strong sector of private ophthalmic services.

The availability of ophthalmologists in Ukraine (Fig. 1) working in facilities under the Ministry of Health has decreased by 22.2 % since 2008, reaching 0.63 per 10,000 population (in Kyiv, the decrease was 26.1 % and the indicator was 1.13). However, when including

specialists employed in departmental and private institutions, the decrease in availability was only 7.1 %, reaching 0.91 ophthalmologists per 10,000 population. It should be noted that during the same period, the overall availability of ophthalmologists in Kyiv increased almost 1.5-fold, reaching the highest level in Ukraine – 3.1 ophthalmologists per 10,000 population.

The ophthalmology workforce has expanded significantly due to specialists employed in departmental and private institutions: while in 2008 they accounted for 17.6 % of all ophthalmologists, by 2022 their share had increased to 31.2 % (in Kyiv, from 25.5 % to 63.0 %, respectively).

The availability of ophthalmologists working in Ministry of Health facilities showed substantial regional variation (up to 7.5-fold differences). The highest levels over the past 15 years were recorded in Lviv, Ivano-Frankivsk, and Chernivtsi regions (0.98, 0.92, and 0.91 per 10,000 population, respectively). The lowest levels were observed in the partially temporarily occupied Luhansk, Donetsk, and Kherson regions (0.13, 0.17, and 0.47 per 10,000 population, respectively), although before the war these regions had relatively high ophthalmologist availability (0.82, 0.79, and 0.61 per 10,000 population, respectively).

Consistently low availability of ophthalmologists has been recorded in Kyiv region (although this may be partly compensated by the relatively accessible and well-developed ophthalmic care in the capital) and in Zakarpattia region (0.39 and 0.46 per 10,000 population, respectively).

A telling example is Zakarpattia region, where a comprehensive study of ophthalmic care provision was conducted 10 years ago. It revealed significant problems in access to medical services for the population, especially in rural areas: in 58 % of households with patients, there was no possibility to visit a doctor, of whom 79 % cited

the high cost of services, 13 % the lack of a specialist of the required profile, and 8 % excessively long waiting times for an appointment [5].

The proportion of ophthalmologists working in training institutions, research institutes, and administrative bodies in Ukraine has remained almost unchanged (6.3–6.7 %); however, in Kyiv it has increased to 11.1 %. The qualification level of the ophthalmologists under study has improved: the proportion of physicians of the highest qualification category increased to 50.8 % (53.8 % in Kyiv). This is partly explained by the aging of the medical workforce over the 15-year study period, and partly by physicians' conscientious commitment to continuous professional development and improving their qualifications.

In 2024, the number of full-time ophthalmologist positions in Ukraine was 4,372, with 3,385 individuals employed in these positions (in Kyiv 1,075 and 787, respectively). Staffing of full-time positions with employees was 82.6 %, and with individual practitioners 77.4 % (in Kyiv 84.9 % and 73.2 %, respectively). The majority of full-time positions (73.7 % in Ukraine and 76.4 % in Kyiv) were concentrated in outpatient and polyclinic facilities.

The significant reduction of hospital bed capacity in Ukraine has also affected the provision of ophthalmology beds (Fig. 2): the number decreased by 50 % since 2008, amounting to 0.71 beds per 10,000 population in 2022. In 2024, the inpatient bed capacity of the ophthalmology service within the Ministry of Health system totaled 2,876 beds, which is 56 % fewer than in 2008.

In the capital city, a significant reduction was also observed: the availability of ophthalmology beds for Kyiv residents decreased from 2008 to 0.99 per 10,000 population in 2022 (a 49.5 % decline), and the inpatient bed capacity of the ophthalmology service in Kyiv amounted to 293 beds. It should be noted that this analysis is limited

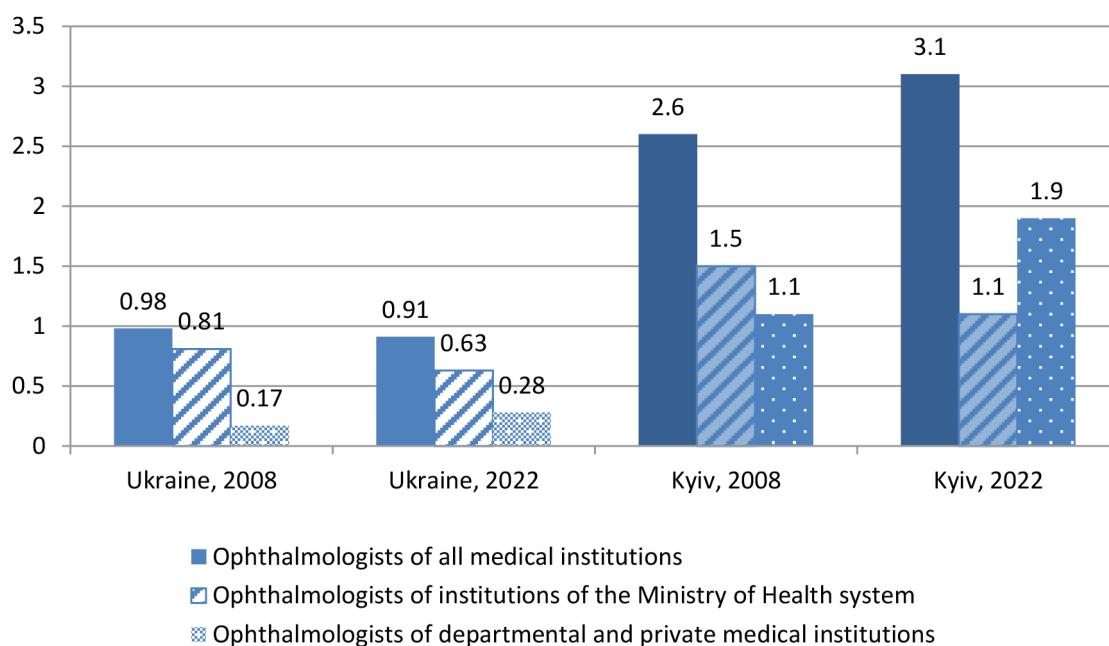


Fig. 1. Dynamics of ophthalmologist availability for the population of Ukraine and Kyiv during 2008–2022 (per 10,000 population)

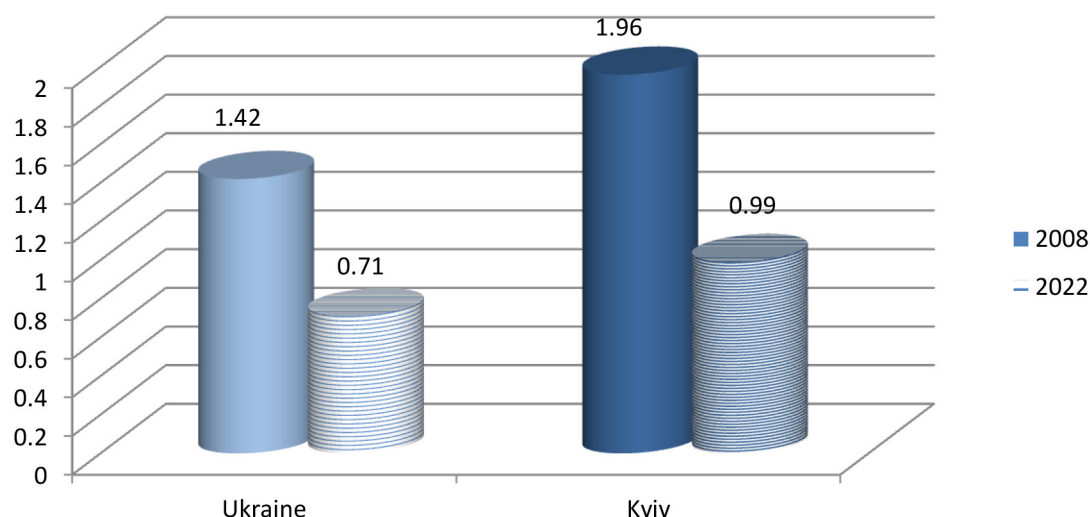


Fig. 2. Dynamics of ophthalmology bed availability for the population of Ukraine and Kyiv during 2008–2022 (per 10,000 population)

by the absence of data on beds in departmental and private medical institutions.

The majority of beds are located in city hospitals (41.2 %) and regional hospitals (27.5 %) – corresponding to today's cluster and supra-cluster hospitals – while only 10.1 % are located in district (general) hospitals. Another 21.2 % of beds are situated in other medical institutions.

Analysis of bed utilization revealed a negative trend toward decreasing average bed occupancy, from 337.5 days in 2008 to 264.3 days in 2024 (a 21.7 % reduction), with

an accelerated decline during the COVID-19 pandemic in 2020 (only 176.6 days). In addition, the war has been “adjusting” the provision of planned inpatient care, while the growing number of urgent patients with eye injuries limits the reduction of “excess” beds. At the same time, the average length of hospital stay has progressively decreased to 4.34 days, while bed turnover reached a record high in 2024 – 60.9 patients per bed per year. Mortality throughout the study period did not exceed 0.01 % in any year and was 0.0046 % in 2024.

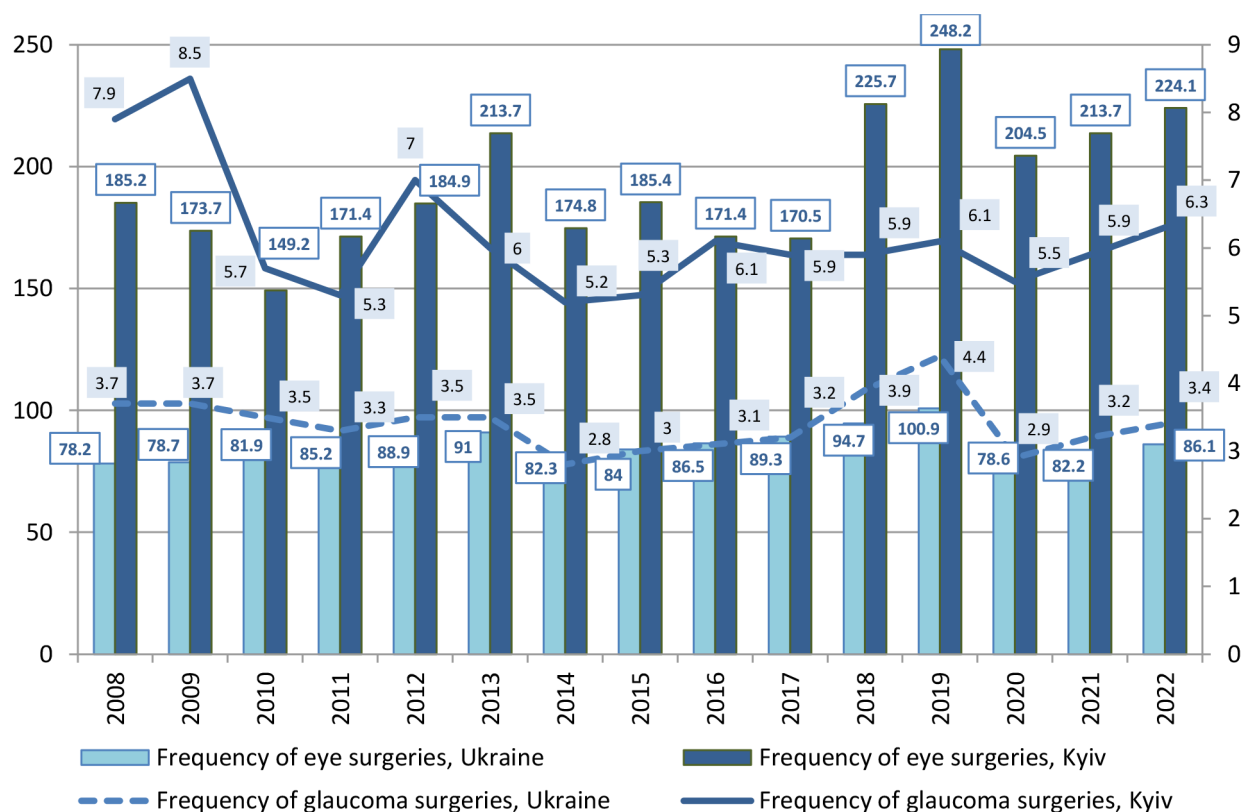


Fig. 3. Dynamics of the frequency of eye surgeries and glaucoma surgeries among the population of Ukraine and Kyiv, performed in all healthcare facilities during 2008–2022 (per 10,000 population)

Special attention should be given to the analysis of surgical activity within the ophthalmic care system, particularly for patients with glaucoma (Fig. 3).

The frequency of surgical interventions on the visual organs performed in all medical institutions increased in Ukraine by 10.1 % over 15 years, reaching 86.1 procedures per 10,000 population; in Kyiv this indicator was nearly twice as high and increased by 21 % to 224.1 procedures per 10,000 population. Glaucoma surgeries were performed much less frequently, showing a decreasing trend, and in 2022 their frequency was 3.4 per 10,000 population in Ukraine and 6.3 per 10,000 population in Kyiv.

Ophthalmic surgical activity demonstrated diverse trends across the regions of Ukraine. In 2022, the leaders were Chernivtsi and Lviv regions, where the frequency of surgeries increased to 54.8 and 49.2 per 10,000 population, respectively, which can be partially explained by the relocation of private clinics due to military events. The number of surgeries decreased in frontline and partially occupied regions (Donetsk, Luhansk, Kherson – 3.32, 0.79, and 4.2 procedures per 10,000 population, respectively). The highest rate remained in Kyiv (63.4), despite a 33.7 % reduction.

The share of glaucoma surgeries within the overall structure of ocular surgical interventions slightly decreased over the 15-year study period – from 4.7 % to 3.9 % (a similar pattern was observed among rural residents). In Kyiv, this proportion decreased from 4.3 % to 2.8 %.

The proportion of ocular surgeries performed on rural residents increased slightly and reached 29.3 %, and for glaucoma surgeries – 32.7 %. The frequency of surgical interventions among rural residents showed the same trends: in 2022, the rates of ocular surgery and glaucoma surgery were 27.9 and 1.1 procedures per 10,000 rural residents, respectively.

The decline in the frequency of surgical interventions may be partly explained by the general downward trend in glaucoma incidence – or more likely, by its underdiagnosis among the adult population. Glaucoma surgeries were performed most frequently in Mykolaiv, Chernihiv, and Cherkasy regions (3.99, 2.94, and 2.37 per 10,000 population, respectively).

Moreover, performing surgical procedures requires specific conditions – the availability of equipment, technologies, and, undoubtedly, qualified specialists. The conducted correlation analysis demonstrated a direct, strong, and statistically significant relationship between the level of physician availability for the population

and the frequency of eye surgeries ($r = 0.7616$; $p < 0.00001$), and a direct, weak, and non-significant relationship between the frequency of glaucoma surgeries and physician availability ($r = 0.2113$; $p = 0.300112$).

The presented analysis refers only to ophthalmic surgeries performed in inpatient departments of healthcare facilities within the Ministry of Health system. However, eye surgeries are also performed in outpatient settings, as well as in departmental and private medical institutions (Table 1).

Over the past 15 years, the share of eye surgeries performed in outpatient and polyclinic facilities has increased and now accounts for approximately two-thirds of all surgeries. It is also evident that patients increasingly prefer departmental and private medical institutions for glaucoma surgery. As for eye surgeries overall, only residents of Kyiv tend to favor the private sector. In Ukraine as a whole, the proportion of such surgeries has increased but still reaches only 31.4 %. This is explained by the availability of the ophthalmology package within the Medical Guarantee Program, which provides free cataract extraction with intraocular lens implantation – a rather common procedure.

According to data from Pro-Consulting, which conducted an analysis of the ophthalmology services market in Ukraine, public medical institutions provide on average three times more services (examinations, surgeries, procedures) than the private sector, with 90 % of them being free ophthalmologist consultations. Therefore, the primary consumers of these services are individuals with below-average income levels. The private sector in Ukraine is represented by 93 specialized ophthalmology clinics and centers, and 328 ophthalmologists provide private medical practice as individual entrepreneurs.

Discussion of research results

Public healthcare facilities providing ophthalmic care continue to face various challenges, including limited resources and infrastructure, particularly in rural areas, in de-occupied regions, or near the contact line. This may lead to certain inequalities in access to quality ophthalmic services and care [2]. The provision of eye care is characterized by significant disparities caused by geographic distance to healthcare providers, age, and lack of transportation, all of which affect patients' adherence to treatment.

The utilization of ophthalmic services largely depends on the availability of insurance coverage for these services (mostly relevant for other countries; in Ukraine, this refers

Table 1

Characteristics of the dynamics of eye surgeries and glaucoma surgeries

Type of operation and territory	Total number of operations performed, absolute number		The proportion of operations that were carried out			
			in outpatient clinics, %		in departmental and private institutions, %	
	2008	2022	2008	2022	2008	2022
on the organs of vision, Ukraine	361,383	354,627	48.9	60.2	18.3	31.4
including glaucoma, Ukraine	17,109	13,890	6.8	64.9	10.3	66.8
on the organs of vision, Kyiv	49,966	66,149	45.5	69.1	9.3	60.5
including glaucoma, Kyiv	2,146	1,871	21.1	65.2	8.3	53.7

to coverage under the Medical Guarantee Program) as well as referrals and recommendations from primary healthcare professionals [6]. Addressing the shortage of human resources in ophthalmology can be partly achieved by involving primary healthcare workers and non-ophthalmic personnel, who can help ensure continuous monitoring of eye health [7].

Enhancing the effectiveness and population coverage of ophthalmic services can be achieved through synergistic collaboration between optometrists and nurses: optometrists, with more specialized training in ophthalmic disease diagnostics, can perform screening functions, while nurses may carry out complex procedures, such as administering medications via intravitreal injections [8].

A successful attempt to improve the organization of ophthalmic care was the creation of the IRIS® Registry by the American Academy of Ophthalmology, where ophthalmologists in a large database were classified into one of several general or subspecialty categories: cataract, cornea, glaucoma, retina, and others. This model helped identify an ophthalmology subspecialist for a specific patient with a particular eye condition and allowed researchers to analyze workforce development trends within the ophthalmic care system [9].

An analysis of ophthalmic care provision conducted by American researchers showed that ophthalmology is expected to face the greatest physician shortage among all surgical specialties. This is due not only to an insufficient number of ophthalmologists but also to their uneven distribution across the country. Adequate access to ophthalmic care improves treatment outcomes and increases screening rates. Physician shortages are usually assessed by calculating the number of doctors per capita; however, the demand for specialists also depends on demographic characteristics, population health status, and the level of healthcare accessibility in a given area [10].

A serious challenge for ophthalmic care, driven by population aging, may be the increasing number of patients with age-related macular degeneration – a burden that even well-resourced healthcare systems may struggle to handle. Improving treatment effectiveness may be facilitated by actively engaging patients through digital solutions [11]. Ophthalmologists have a positive attitude toward the implementation of artificial intelligence as a supportive tool for managing diabetic retinopathy and glaucoma [12].

Patient adherence to glaucoma diagnosis and treatment has recently deteriorated, which is primarily explained by

the consequences of martial law: economic instability, forced displacement, stress and trauma. At the same time, in recent years, the number of ophthalmologists referring patients with glaucoma for surgical treatment has increased, which means that specialists are increasingly aware of the effectiveness of timely surgical treatment of glaucoma [13].

Prospects for further research

Prospects for further research are related to studying different models of organizing ophthalmic care, particularly for patients with glaucoma, with the aim of improving the national model.

Conclusions

The overall availability of ophthalmologists in Ukraine has decreased by 7.1 % and currently amounts to 0.91 physicians per 10,000 population. In Kyiv, this indicator has increased almost 1.5-fold, reaching the highest level in the country – 3.1 physicians per 10,000 population, largely due to specialists working in departmental and private institutions. In 2022, these physicians accounted for 31.2 % of all ophthalmologists (63.0 % in Kyiv). The availability of ophthalmologists varied significantly across regions (up to a 7.5-fold difference). Staffing of established positions with actual personnel was 77.4 % (73.2 % in Kyiv). Two-thirds of all established ophthalmology positions are concentrated in outpatient and polyclinic facilities.

The availability of ophthalmology hospital beds decreased by 50 % and amounted to 0.71 beds per 10,000 population in 2022 (in Kyiv – a 56 % reduction to 0.99 beds per 10,000). The frequency of eye surgeries performed across all medical facilities in Ukraine increased by 10.1 % over 15 years, reaching 86.1 surgeries per 10,000 population (in Kyiv – a 21 % increase to 224.1). The proportion of glaucoma surgeries ranges between 3–4 %, while their frequency has decreased threefold both in Ukraine as a whole and in Kyiv (to 1.03 and 1.96 per 10,000 population, respectively). Approximately two-thirds of all eye surgeries are performed in outpatient and polyclinic settings. Patients increasingly prefer departmental and private medical institutions for ophthalmic surgeries, particularly for glaucoma.

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Purpose to examine the dynamics of staffing and resource indicators of ophthalmic care provision for the population of Ukraine and residents of Kyiv over the past 15 years, with particular emphasis on glaucoma.

Materials and methods. The study was based on official statistical data from the Public Health Center of the Ministry of Health of Ukraine and the Kyiv Municipal Information and Analytical Center for Medical Statistics for 2008–2024. Bibliographic, statistical, and analytical methods were applied.

Results. The overall availability of ophthalmologists in Ukraine decreased by 7.1 % and currently amounts to 0.91 physicians per 10,000 population. In Kyiv, this indicator increased almost 1.5-fold, reaching 3.1 physicians per 10,000 population, largely due to specialists employed in departmental and private healthcare institutions (30–60 %). Two-thirds of established ophthalmology positions

are concentrated in outpatient and polyclinic facilities. The availability of ophthalmology hospital beds decreased by 50 %, amounting to 0.71 beds per 10,000 population (a 56 % reduction to 0.99 beds in Kyiv). The frequency of eye surgeries increased by 10.1 % to 86.1 procedures per 10,000 population, while glaucoma surgery rates decreased threefold both in Ukraine and in Kyiv (to 1.03 and 1.96 per 10,000 population, respectively).

Conclusions. Despite adverse circumstances, ophthalmic care in Ukraine remains stable: although the availability of specialized physicians and hospital beds has declined, the accessibility and volume of ophthalmic services – including surgical interventions – have been maintained. A clear trend is observed toward shifting a substantial proportion of surgical procedures to outpatient–polyclinic and private healthcare facilities.

Key words: organization of ophthalmic care, availability of ophthalmologists and ophthalmic beds, eye and glaucoma surgeries, indicator dynamics, Ukraine, Kyiv.

Мета: дослідити динаміку показників кадрового та ресурсного забезпечення офтальмологічної допомоги населення України та жителям м. Києва протягом останніх 15 років, зокрема за наявності глаукоми.

Матеріали та методи. У дослідженні використано дані офіційної статистики Центру громадського здоров'я МОЗ України за 2008–2024 роки, а також Київського міського інформаційно-аналітичного центру медичної статистики. Ресурси офтальмологічної допомоги м. Києва були вибрані як об'єкт дослідження не випадково, оскільки в столиці країни зосереджено офтальмологічні клініки (приватні та державні) із сучасним обладнанням, найкращі кадри високого рівня кваліфікації з великим стажем роботи, у т. ч. науковці та викладачі в галузі офтальмології. Застосовано методи дослідження: бібліографічний, статистичний і аналітичний методи.

Результати. Встановлено, що забезпеченість населення України лікарями-офтальмологами становить 0,91 лікаря на 10 000 населення із значними регіональними розбіжностями (до 7,5 раза), за досліджуваній період вона зменшилася на 7,1 %, а в Києві зросла майже в 1,5 раза й сягнула рівня 3,1 лікаря на 10 000 населення (найвищого рівня в Україні, здебільшого через забезпеченість офтальмологами приватних та відомчих клінік). В Україні у 2022 році питома вага офтальмологів приватних та відомчих закладів становила 31,2 %, у Києві – 63,0 %. Значна різниця між чисельністю штатних посад та фізичних осіб лікарів-офтальмологів (4372 та 3385 в Україні та 1075 та 787 по Києву) у 2024 році призвела до недостатньої укомплектованості штатних посад – зайнятими посадами та фізичними особами (82,6 % та 77,4 % в Україні та по Києву 84,9 % та 73,2 % відповідно). Більшість штатних посад лікарів-офтальмологів передбачено в амбулаторно-поліклінічних закладах (73,7 % в Україні та 76,4 % у Києві).

Рівень забезпеченості населення України ліжками офтальмологічного профілю становив у 2022 році 0,71 на 10 000 населення за скорочення на 50 % (у Києві відповідно 0,99 за скорочення на 49,5 %). Загалом ліжковий фонд офтальмологічної служби системи МОЗ з 2008 року скоротився на 56 % і становив 2876 ліжок (зокрема, в Києві 293 ліжок) у 2024 році. При цьому частота оперативних втручань на органах зору зросла на 10,1 % (у Києві – на 21 %) і становила 86,1, а в Києві – 224,1 операції на 10 000 населення. Однак частота операцій з глауками мала тенденцію до зниження і у 2022 році становила 3,4 в Україні та 6,3 на 10 000 населення в Києві.

Питома вага операцій на органах зору, що проводяться в амбулаторно-поліклінічних закладах, від усіх операцій збільшилася до 60 %. Для отримання офтальмологічної допомоги пацієнти все частіше вибирають відомчі та приватні медичні заклади, зокрема для проведення хірургічних операцій у разі глаукоми. Загалом щодо операцій на органах зору перевагу приватному сектору надають 60,5 % киян та лише 31,4 % населення України, що спричинено впровадженням офтальмологічного пакета медичних гарантій, який передбачає безоплатне лікування катаракти та глаукоми.

Висновки. Незважаючи на складні соціально-економічні умови в Україні, яка перебуває у стані війни, офтальмологічна допомога характеризується стабільністю: зі зниженням забезпеченості населення профільними лікарями та ліжками зберігаються доступність та обсяги надання офтальмологічних послуг, зокрема хірургічних втручань. Відмічається тенденція зменшення значної частини оперативних втручань до амбулаторно-поліклінічних та приватних закладів.

Ключові слова: організація офтальмологічної допомоги, забезпеченість населення офтальмологами та офтальмологічними ліжками, хірургічні операції на органах зору та в разі глаукоми, динаміка показників, Україна, м. Київ.

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